CLMPTO

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1. (Original) A polarizing process comprising:

moving a flowing mixture of gas, at least containing a polarizable nuclear species and vapor of at least one alkali metal, with a transport velocity that is not negligible when compared with a natural velocity of diffusive transport;

propagating laser light in a direction that intersects the flowing gas mixture;

containing the flowing gas mixture in a polarizing cell; and

immersing the polarizing cell in a magnetic field.

2. (Currently Amended) The process of claim 1 wherein the polarizing cell has a shape with a transverse dimension and a length substantially greater than its transverse dimension, such that the shape of the polarizing cell directs the flowing mixture of gas along a direction generally opposite to the direction of laser light propagation.

3. (Original) The process of claim 1 wherein the laser light has an attenuation length and the polarizing cell has a length substantially greater than the laser attenuation length, thereby causing efficient transfer of polarization from the laser to the alkali metal vapor, even at low operating pressure where the most efficient alkali-polarizable nuclear species polarization transfer mechanism dominates.

4. (Original) The process of claim 1 wherein the transport velocity of the flowing gas is substantially greater than the natural velocity of diffusive transport.

5. (Currently Amended) The process of claim 1 wherein the polarizing cell has an operating gas pressure that is less than two atmospheres but greater than a pressure required to efficiently quench an alkali optical pumping using a combination of at least 2 torr of a polarizable nuclear species and a minimum pressure of quenching gas, ~~typically~~ of at least 60 torr of nitrogen.

6. (Original) The process of claim 1 wherein the magnetic field is uniform and substantially aligned with the direction of laser light propagation.

7. (Currently Amended) The process of claim 1 further comprising:

condensing the alkali metal vapor from the gas mixture in the ~~propogated~~ propagated laser light.

8. (Original) The process of claim 1 wherein the laser light enters the polarizing cell by passing through a window of the polarizing cell which is at a temperature substantially lower than that of the polarizing cell, thereby reducing attenuation of the laser light in an unpolarized alkali metal vapor layer in contact with the window.

9. (Original) The process of claim 7 wherein the condensation occurs in an extension of the polarizing cell that is collinear with the polarizing cell, and through which the laser propagates, thereby providing continuous polarization of the alkali metal vapor up to and during condensation.

10. (Original) The process of claim 7 wherein the condensing results in condensed rubidium droplets which come to rest in at least one of the following group of high temperature regions:

a saturating region; and

a heated region of the polarizing cell.

11. (Original) The process of claim 1 further comprising:

saturating an original gas mixture with the alkali metal vapor to create the flowing gas before the flowing gas enters the polarizing cell.

12. (Original) The process of claim 1 wherein the polarizing cell has an operating temperature that is greater than 150°C, thereby allowing faster polarization time constants and higher achievable polarization than existing practice.

13 – 22 (Canceled)